POSSIBLE INTERFERENCE:

On Dec. 24, 1998, I filed patent CA2256918: a "telepointer" comprised of two different parts:

1. a telepointer transmitter consisting of a video projector with a camera built into the projector so that the camera can see when someone is pointing with a laser pointer at the projected image and so that the device allows a laser pointer to be used as a cursor control device; and
2. a telepointer receiver consisting of a wearable pendant with miniature robotic laser pointer inside the pendant, for being remotely controlled by the transmitter (1.).

I filed a corresponding U.S. application 09/421938 which was stamped "10/21/99".

I wish to have my Canadian patent number 2256918 included as a priority document.

On July 6, 1999, Hansen filed US patent 6,275,214 describing essentially the same invention as part (1) (e.g. the transmitter portion) of my "telepointer" patent.

Hansen's patent issued August 14, 2001.

Thus I would like to file a voluntary divisional application having the subject matter of my "Telepointer Transmitter". This voluntary divisional application is for the transmitter portion of my invention, namely a new user interface for a computer, as supported by the right hand half my FIG. 2, by the left hand half of my FIG. 4, and by my entire FIG. 5. Improvements are supported by my entire FIG. 6 and entire FIG. 9.

On filing the divisional application, you I request that an interference be declared. See R607 below in this regard.

A7 1.607 Request by applicant for interference with patent.
(a) An applicant may seek to have an interference declared between an application and an unexpired
patent by,
(1) Identifying the patent:

Hansen US patent 6,275,214.

(2) Presenting a proposed count:

I wish to interfere Hansen's claims 1-11, 17-19, and 24-26.

(3) Identifying at least one claim in the patent corresponding to the proposed count: Please see following description.
(4) Presenting at least one claim corresponding to the proposed count or identifying at least one claim
already pending in its application that corresponds to the proposed count, and, if any claim of the patent or
application identified as corresponding to the proposed count does not correspond exactly to the proposed
count, explaining why each such claim corresponds to the proposed count, and
(5) Applying the terms of any application claim,
(i) Identified as corresponding to the count, and
(ii) Not previously in the application to the disclosure of the application.
(6) Explaining how the requirements of 35 U.S.C. 135(b) are met, if the

claim presented or identified
under paragraph (a)(4) of this section was not present in the application until more than one year after the issue date of the patent.
(b) When an applicant seeks an interference with a patent, examination of the application, including any
appeal to the Board, shall be conducted with special dispatch within the Patent and Trademark Office. The
examiner shall determine whether there is interfering subject matter = claimed in the application and the patent
which is patentable to the applicant subject to a judgment in an interference. If the examiner determines that
there is any interfering subject matter, an interference will be declared. If the examiner determines that there is
no interfering subject matter, the examiner shall state the reasons why an interference is not being declared and otherwise act on the application.
(c) When an applicant presents a claim which corresponds exactly or substantially to a claim of a patent,
the applicant shall identify the patent and the number of the patent claim, unless the claim is presented in
response to a suggestion by the examiner. The examiner shall notify the Commissioner of any instance where
an applicant fails to identify the patent.
(d) A notice that an applicant is seeking to provoke an interference with a patent will be placed in the file
of the patent and a copy of the notice will be sent to the patentee. The identity of the applicant will not be
disclosed unless an interference is declared. If a final decision is made not to declare an interference, a notice
to that effect will be placed in the patent file and will be sent to the patentee.

Correspondence of the figures (e.g. Hansen's claims in terms of my drawings):

Hansen CLAIM 1:

Hansen's claim 1 corresponds to the situation in my FIG. 5 where a lecturer 270 uses a laser pointer 520 to control a computer by shining a laser pointer 520 at a computer screen 260.

In my embodiment of the invention I also allow audience members to control the computer with their laser pointers such as 540.

Although the computer itself is not shown in the figure, the title of my patent makes it clear that the invention is for interaction with EITHER a computer OR one or more other people, through a camera. The camera of my invention is sometimes referred to as a scanner, e.g. "PROJECTOR AND SCANNER" 550, because it is taking pictures of a flat screen. I show that in FIG. 1 when a camera records a flat screen it is often referred to as a scanner. The camera (scanner) may be built into the projector as in FIG. 5, or it may be separate as in, for example, FIG. 6, described in the text as "scanner (or camera) 670".

Under "SUMMARY OF THE INVENTION", I describe how my wife can use the laser pointer to move a shared cursor on my wearable computer:
"While shopping at the grocery store, a photographer can look at apples on the shelf, and his wife at home can turn on her computer and ...kind of interaction... and to write messages upon the retina of an eye of the wearer of the apparatus.".

I also describe that the Telepointer can be used as a substitute for a traditional mouse in moving the cursor on a computer screen:
"One or more remote managers may point at an object in the scene either with a traditional mouse cursor, or with a TelePoint (TM) remote laser pointer system previously described." (toward the end of the description of FIG. 8).

In the description of FIG. 11, I also describe how the laser beam can be used to move a computer cursor, so that the computer cursor follows the laser beam.

What Hansen refers to as the "internal cursor" is what I just call a "cursor" and what Hansen refers to as the "external cursor" is what I call the "blob of light" or the like, produced by the laser pointer.

The at least one property of the "external cursor" (my blob of laser light) that I detect is at least one of: brightness, polarization, and color. I have noted that laser light is brighter than anything else on the computer screen, and I have noted that laser light is redder (if it's a red laser) than anything else on the screen, and I have noted that laser light is more polarized than anything else on the computer screen, or that its polarization can be made unique and therefore distinguishable, as described in the text supporting my FIG. 2 ("polarizers 280, 282", etc.). I also propose other properties, such as:
"Moreover, other forms of Signal to Noise Ratio (S.N.R.) improvement can be implemented, such as the use of a lock--in camera for scanner 670 together with a laser pointer with chopper or modulation." in my description of FIG. 6. Thus I have at least one detected property for my "external cursor".

I generate commands for my computer by, for example, detecting whether or not the laser beam is on. This can control the sync of my computer, turn on and off various devices of my computer, or, for example, command a remote receiver to do certain things. Thus, for example, my wife can sit in our living room and remotely issue commands to my wearable computer while I'm shopping at the grocery store, as described throughout the disclosure.

Hansen CLAIM 2:

I describe the use of a camera for doing the detection of the blob of light on the computer screen. The leftmost side of FIG. 4 makes this clear, because we see that SCREEN CAMERA 430 grabs pictures of the screen, and VISION PROCESSOR 440 is a computer that generates commands based on at least one detected property of the light source on the screen. Various shapes 410 can be present, and the unique shape of the laser dot 420 is detected by image processing.

Hansen CLAIM 3:

I describe "multiple exposures" and my methods of "lightvectors". Lightvectors include addition, subtraction, and other simple image processing operations. My subtraction of two successive frames of video, for example, is "comparing the image to a previously captured image to detect differences between the image and the previously captured image.". I also discuss conversion of color spaces, and similar processing of multiple frames of video sequences.

Hansen CLAIM 4:

I describe many filters throughout the disclosure. For example, I describe in the description of FIG. 5 (last paragraph, right before FIG. 6) how various audience members can use different colored laser pointers, and how I can use filtering to distinguish which of the laser pointers is being pointed at the screen, so that each color of laser pointer can issue a different command (e.g. so one person can issue a command to my wearable computer to paint red light on my eye, whereas someone else can issue a different command for green light, etc.).

I also describe other ways of filtering the image, e.g. by using polarizers over the camera (polarizer 280), red filters, narrowband filters, as well as periodic filters, modulators. I also talk about other processing that's equivalent to filters, such as in my description of FIG. 7, which includes visual filters ("Motion restorer 780" is a kind of filter, and motion estimation involves convolution with spatial filters, and it also involves lowpass filters).

Thus I do a variety of filtering operations to detect at least one property of the cursor (color, shape, polarization, and motion).

Hansen CLAIM 5:

I describe selection of the brightest portion of the image. This is particularly evident in FIG. 4 where:
"The video signal output of screen camera 430 is connected to a vision processor 440 which simply determines the coordinates of the brightest point in the image seen by camera 430 if there is a dominant brightest point.".

Selection of the brightest point in an image is done by thresholding the image (e.g. comparing the image with a threshold value to see which pixels exceed the threshold). A thresholded (binary) image is depicted in FIG. 4 in which black denotes the laser pointer blob, and white denotes the background.

Hansen CLAIM 6:

I also do filtering of the image to detect the color of the cursor, and in fact I do this even with multiple cursors so that I can detect the color of each one: "coloured laser, such as a green laser pointer, and this laser beam 540 may by distinguished from beam 520 by projector and scanner unit 550"

I also discuss how my filtering of the image affects image quality:
"Thus filter 610 will not appreciably alter the colour or appearance of objects seen on screen 260."

Hansen CLAIM 7:

I describe, in the description of FIG. 4, how the shape of the laser pointer blob is unique, and how I can find this shape's location to sub-pixel accuracy: "vision 440 may determine the coordinates of a bright red blob 420 to sub--pixel accuracy", various shapes being depicted in FIG. 4, from among which the unique shape of the laser dot 420 is evident in both shape and size (e.g. a small distinct from larger circles, squares, triangles, etc.). It follows that the unique shape of the blob of light made by the laser pointer can be used to locate its exact position to within less than one pixel of the resolution of camera 430.

Hansen CLAIM 8:

The transmission of the external cursor to the screen with optical energy is simply a round-about way of saying that we are shining light at the screen (with the laser pointer).

Hansen CLAIM 9:

The fact that the screen is flat is evident from my FIG. 6 where I depict a planar projection screen 260. The fact that a regular computer monitor can be used as well as the screen is evident from my FIG. 3. Even in my FIG. 2 I show both a projection screen as well as a wearable computer that has a display screen built into my eyeglasses. Thus a I have: "associated screen is a substantially planar surface remotely located external to the computer and any associated monitor".

Hansen CLAIM 10:

The associated screen of my invention can also be a "computer monitor". The term "computer monitor" is commonly used to denote television screens that accept a VGA television standard, such as I show in my FIG. 3., or such as what many video projectors produce. Thus any of various video displays of my invention can be referred to by the equivalent name "computer monitor".

Hansen CLAIM 11:

I describe in my FIG. 7, my motion estimation system. Here I detect motion, estimation motion, compensate for motion, and then restore the motion that was detected from the cursor, back to the cursor, so that the movement of the cursor will match the movement of the laser pointer. In Hansen's terminology, I detect the motion of the external cursor and since my computer detects the motion property, it then causes the computer to issue commands to the internal cursor to match the motion of the external cursor. Thus commands of the computer are responsive to the at least one motion property of the external cursor.

In the context of my FIG. 10, I also describe detection of other kinds of motion of an external cursor (optical cursor from laser pointer): "...red blob in motion. A very sensitive receiver 1060 is tuned to pick up any quasi--periodic or near cyclostationary signal that has the form of a television signal" (e.g. to issue commands to a computer to sound an alarm based on the motion patterns of an external cursor).

Hansen CLAIMS 17 and 18:

Here Hansen does not specify whether the computer is local or remote, but otherwise combines features of claims 1 and 2 into claim 17, which is subject matter in my original disclosure.

Hansen CLAIM 19:

Since this is a re-wording of subject matter claimed in the above claims, but with slightly different terminology (e.g. "optical cursor" instead of "external cursor"), by the same arguments above, the subject matter of claim 19 is covered by my earlier disclosure.

Position of "optical cursor" is same as my position of blob of laser light in leftmost portion of my FIG. 4, as denoted by "x" and "y" in my figure.

Hansen CLAIMS 24-26:

The plurality of user selectable cursor properties could be any of the ones I disclosed, such as shape, polarization, phase (my lock-in camera feature), intensity, or color. For example, I can change the commands issued to the computer by changing the color of my pointer ("optical cursor"). When a user in my FIG. 5 picks red for the "optical cursor" my computer presentation system commands the remote wearable computer to draw red light on the retina of an eye of its wearer. When a user of my FIG. 5 changes to green, my apparatus issues a different command, namely to command my idraw package running on the remote wearable computer to choose a different color from its color palette.

Thus I have the features of Hansen's claim 24 in my originally filed disclosure.

Any computer has some kind of storage media, which I describe in my disclosure. "transmitted to a remote location for storage", in my disclosure description of FIG. 1, for example. My computer also has instructions, just like any other computer, regardless of whether it's a wearable computer or a desktop computer or a laptop computer. My wearable computer has different commands stored in its programs on its hard drive, as well as in RAM which is also a form of storage. All computers have computer readable storage media for storing their computer commands within their computer programs. My command to set or select color is stored also, and is responsive, as I describe in my disclosure (e.g. description of FIG. 5) to the color of the "optical cursor" of the laser pointer.

Thus I have the features of Hansen's claims 24-26 fully supported in my disclosure.

--Steve Mann

These are the new claims I would like to insert into my divisional application, as supported fully in my original disclosure I wish to cite as priority document (Canadian pat. 2256918).

I have used the exact word-for-word wording of Hansen, and I have kept the numbering as in Hansen. I will be happy to renumber these claims if you wish (e.g. so that they would be consecutively numbered).

Here are 17 claims, 6 of which are independent.

Please use these new claims in calculating the claims fee.

1. A method for remotely controlling a computer having an associated screen for displaying output from the computer and having an internal cursor generated by the computer, the method comprising:
detecting at least one property of an external cursor and position of the external cursor relative to the output from the computer;
generating a command to move the internal cursor to a position on the screen corresponding to the position of the external cursor; and
generating a command for the computer based on the at least one detected property of the external cursor.
2. The method of claim 1 wherein the step of detecting comprises:
capturing an image of the screen and the external cursor with a camera; and
processing the image to detect the at least one property of the external cursor.
3. The method of claim 2 wherein the step of processing the image comprises:
comparing the image to a previously captured image to detect differences between the image and the previously captured image.
4. The method of claim 2 wherein the step of processing the image comprises:
filtering the image to detect the at least one property of the external cursor.
5. The method of claim 4 wherein the step of filtering comprises thresholding the image to detect intensity of the external cursor relative to intensity of the computer output.
6. The method of claim 4 wherein the step of filtering comprises filtering the image to detect color of the external cursor.
7. The method of claim 4 wherein the step of filtering comprises filtering the image to detect shape of the external cursor.
8. The method of claim 1 further comprising transmitting the external cursor to the screen using a source of directed optical energy.
9. The method of claim 1 wherein the associated screen is a substantially planar surface remotely located external to the computer and any associated monitor, the method further comprising projecting an image of the output from the computer onto the associated screen.
10. The method of claim 1 wherein the associated screen is a computer monitor.
11. The method of claim 1 wherein the step of detecting at least one property of the external cursor comprises detecting a pattern of movement of the external cursor.

17. A method for generating computer commands based on position and at least one property of an external cursor, the method comprising:
displaying output from a computer;
displaying the external cursor on the output;
capturing an image of the output;
processing the image to determine position and at least one property of the external cursor; and

converting the position and the at least one property to corresponding computer commands so an internal cursor tracks position of the external cursor.

18. The method of claim 17 wherein the step of displaying output from a computer comprises projecting an image of the output on a remotely located screen.

19. A method for remotely controlling a computer, the method comprising:

displaying output from the computer on a remotely located screen;

projecting an optical cursor generated by a hand-held pointer on the remotely located screen;

capturing an image of at least a portion of the remotely located screen;

processing the image to detect position of the optical cursor and at least one user selectable property of the optical cursor; and

generating commands to control position of a cursor generated by the computer based on position of the optical cursor and to control functioning of the computer based on the at least one property of the optical cursor.

24. A computer presentation system for generating commands to remotely control a computer based on a plurality of user selectable properties of an optical cursor generated by a hand-held pointer and projected on a screen displaying output from the computer, the system comprising:

a camera for capturing an image of the output from the computer; and

a processor in communication with the camera for processing the image to detect position of the optical cursor and at least one property of the optical cursor and for converting the position and at least one property to corresponding commands to control the computer and move an internal cursor to a position corresponding to the optical cursor while the optical cursor remains within the output displayed on the screen.

25. A computer readable storage medium having stored data representing instructions executable by a computer to generate commands to control a cursor generated by the computer based on a plurality of user controllable properties of an external cursor, the computer readable storage medium comprising:

instructions for detecting at least one of the user selectable properties of the external cursor; and

instructions for generating a command for the computer based on the at least one detected property of the external cursor.

26. A computer readable storage medium having stored data representing instructions executable by a computer to generate commands to control the computer based on an external cursor projected onto an image of output generated by the computer, the computer readable storage medium comprising:

instructions for processing an image of the output to detect at least one property of the external cursor including position of the external cursor relative to the output; and

instructions for converting the position and the at least one property to a command to control the computer to move an internal cursor to a position corresponding to the external cursor.